Seasonal forecasts
presented by:

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Why do we apply statistical methods to climate model forecasts?

“...statistical correction methods treating individual locations (e.g. multiple regression or principal component regression) may be recommended for today’s coupled climate model forecasts”. (Barnston and Tippett, 2017).

Why do we not use just a single model in our forecasts for southern Africa?

“...multi-model forecasts outperform the single model forecasts...” (Landman and Beraki, 2012).

For the official seasonal forecast for South Africa, visit the South African Weather Service website at [http://www.weathersa.co.za/home/seasonal](http://www.weathersa.co.za/home/seasonal)
Southern Africa Forecasts
Prediction Method

• Three-month seasons for seasonal rainfall totals and average maximum temperatures of NMME ensemble mean forecasts are interpolated to Climatic Research Unit (CRU; Harris et al. 2014) grids (0.5°x0.5°) by correcting the mean and variance biases of the NMME forecasts. Probabilistic forecasts are subsequently produced from the error variance obtained from a 5-year-out cross-validation process (Troccoli et al. 2008). Forecasts are presented up to 3 months ahead in order to cover a 6-month period.

• Forecasts are produced for three categories:
  • **Above:** Above-normal (“wet” / “hot”, rainfall totals / maximum temperatures higher than the 75th percentile of the climatological record)
  • **Below:** Below-normal (“dry” / “cool”, rainfall totals / maximum temperatures lower than the 25th percentile of the climatological record)
  • **Normal:** Near-normal (“average” season)

• Verification:
  • ROC Area (Below-Normal) – The forecast system’s ability to discriminate dry or cool seasons from the rest of the seasons over a 32-year test period. ROC values should be higher than 0.5 for a forecast system to be considered skilful.
  • ROC Area (Above-Normal) – The forecast system’s ability to discriminate wet or hot seasons from the rest of the seasons over a 32-year test period. ROC values should be higher than 0.5 for a forecast system to be considered skilful.
Tailored Forecasts
Prediction Method

• NMME ensemble mean forecasts are interpolated to a rain gauge at farm near Grootfontein in northern Namibia (Landman et al. 2016) and to inflows into Lake Kariba on the border between Zimbabwe and Zambia (Muchuru et al. 2014).

• Forecasts are produced for three categories:
  • Above: Above-normal (higher than the 75th percentile of the climatological record)
  • Below: Below-normal (lower than the 25th percentile of the climatological record)
  • Normal: Near-normal (“average” season)
Global SST and ENSO Forecasts
Prediction Method

• Forecasts for global sea-surface temperature (SST) fields are obtained through a combination of NMME models and a linear statistical model that uses antecedent SST as predictor (Landman et al. 2011). Forecasts for the Niño3.4 area (see insert) are derived from the global forecasts.

• Three-month Niño3.4 SST forecasts are produced for three categories:
  • El Niño: SST above the 75th percentile
  • La Niña: SST below the 25th percentile
  • Neutral: Neither El Niño nor La Niña


• Kirtman, B. P. and Co-authors 2014: The North American Multimodel Ensemble: Phase-1 seasonal-to-interannual prediction; Phase-2 toward developing intraseasonal prediction. Bulletin of the American Meteorological Society. 95, 585–601. doi: http://dx.doi.org/10.1175/BAMS-D-12-00050.1


